

UNIVERSITY OF BAHRAIN
COLLEGE OF INFORMATION TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE

ITCS 385 – Database Systems

Midterm Exam
Semester I, 2012-2013

Date: Sunday November 11th, 2012

Time: 1:00pm - 2:30pm

Name		
Student I.D.		
Section	[1] [2] [3]	<i>Please tick one</i>

Question 1	9	
Question 2	8	
Question 3	14	
Question 4	10	
Question 5	9	
TOTAL	50	

Notes:

1. Your answers must be written on the question paper and in the place allocated. Any answer written on any other place will not be marked.
2. Use the back of the pages for any rough work, BUT remember rough work will not be marked.
3. Do not give more than one answer (alternative solutions) to the same question; if you do so then only the first answer will be marked.
4. **Switch off your mobile** and keep it in your pocket or bag.

Question 1 [3 + 3+ 3 =9 marks]

1. Define the following terms:

DBMS: _____

Meta-data: _____

2. Think of two (2) different end users for a bank database. To which user category would each user belong, why?

3. “Restricting Unauthorized Access” is one of the main advantages of using DBMS approach. As a DBA, what can you do to achieve this advantage?

Question 2 [4 + 4 =8 marks]

1. In the ANSI-SPARC 3-level architecture, different external views may have different representations of the same data. Explain this statement and give examples from a database application of your choice.

2. Using the same database for the question above, which DBMS architecture would you choose (Centralized, Two-Tier client-server, or Three-Tier client-server)? Why? And briefly explain the chosen architecture.

Question 3 [14 marks]

Consider the following requirements for designing a database system for UOB library to store data about library items, members and borrowing records. Each item in the library has a unique number, author(s), and title. Each item is categorized into one of the following categories: magazine, journal, or book. Each item also has a publisher who has a unique name and a web address (URL). Publisher's details should be stored in the database, if the publisher has published at least one library item of any category. The main aim of this database system is to keep track of the borrowing transactions. Therefore, a library member is assigned a unique ID from the library and he/she could be either UOB student or faculty. When a member borrows a library item, the borrowing date and the return date are assigned to this transaction.

If a borrower is a student, then he/she can borrow up to two items at a time. It is also important to record student's UOB ID, name, address, and number of borrowed items. On the other hand, if the borrower is a faculty, then he/she can borrow up to five items at the same time. For each faculty borrowing from the library, we need to record his/her CPR, name and address that is made up of college and department. In addition, a faculty has the option to reserve a library item if it's borrowed by someone else. For each library item, there is a waiting list of all borrowers who have reserved this item. The library uses an order number to order borrowers (if a borrower requests a reservation for an item before another borrower then the first must have a smaller order than the second).

Design an ERD for this application. Note any unspecified requirements, and make appropriate assumptions to make the specification complete.

2. Suppose that each of the following operation is applied directly to the Car Rental Database. For each operation, indicate whether this operation will be successful (i.e. will lead to a valid relation state or not), if not, specify the reason(s).

a. *ALTER TABLE rental ADD COLUMN CustomerID;*

Successful operation: (YES / NO)

If NO, WHY _____

a. *DROP TABLE car;*

Successful operation: (YES / NO)

If NO, WHY _____

Question 5 [1.5 + 1.5 + 3 + 3 = 9 marks]

Consider the database schema defined in Question (4) to answer the following SQL questions:

1. Write SQL statements to create the Car relation.

2. Write SQL statements to delete all rental records for CustomerID=101.

3. Write SQL statements to list ID and name of all customers with unknown address sorted by customer name in ascending order.

4. Write SQL statement to list the CarNo, CustomerID, and rentalFees increased by 10% for all cars rented in October 2012.
